



GRAIN THROUGH THE AGES



Grain Through the Ages

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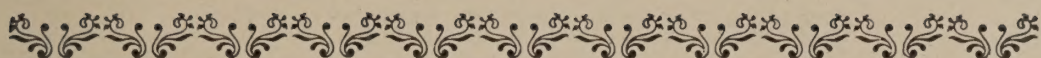
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"Grain Through the Ages," the second book which we have prepared for the use of schools, is most suitable for the 7th, 8th and 9th grades. This publication may be secured free in limited quantities by writing School Health Service, The Quaker Oats Company, 80 East Jackson Street, Chicago, Illinois.



GRAIN THROUGH THE AGES

A LONG, long time ago when the earth was fairly young, someone went walking. Who that someone was we do not know. It may have been a man or a woman, a boy or a girl. However that may be, this someone saw growing among the rocks yellow stalks drooping with heavy little grains. Idly, without thinking, this unknown person shucked a few of the grains as he passed among the stalks. Still without thinking, he popped a few of the grains into his mouth. "Crunch, crunch, crunch," went his teeth as they ground the grain into grist. The very first mill was grinding the very first grain to be eaten by a human being.

Our unknown someone who first learned that grain is good to eat could not foresee what this knowledge was to mean to his children and his children's children, to the countless generations that were to come after him. He had eaten grains, little nuts, as he probably thought of them, and they had tasted good. That is all he

knew. Suppose he had been able to look down through the centuries, what would he have seen?

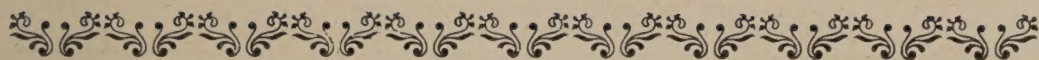
He would have seen men and women and children leaving their life of wandering to settle down into little villages the better to grow the precious grain. He would have seen little villages growing into big cities of brick and marble where men and women exchanged grain for gold and silver in the market places. He would have seen great ships propelled first by oars, then by huge bellying sails and last of all by steam, traveling back and forth between the countries of the earth with their holds crammed full of golden grain.

Suppose we could tell the story of oatmeal to that unknown someone who ate the first grain. Remember he lived long and long ago. He knew nothing of what we know today. We should have to tell him how the oat plant makes the oat grain with the help of the sun, the air, the rain and the earth. We should have to tell him the story of the farmers who take care of the oat plant while it is growing. We should have to tell him about the first farmers; the tools they used; the steps they took through the ages to grow better grain.

We should have to tell him the story of the millers who grind the grain and the story of the cooks who make it into bread and cereals. Yes, the story of grain is as old as the world is old, as new as science is new. It tells of sunlight changed into the food upon which the whole animal kingdom depends for life. It tells the history of the plough from the time that it was only a crooked stick until the day when the first tractor plough struck through the broad acres of the West. It tells of the milling industry from the time when a set of teeth ground the first grain up to the time of the wonderful mills of to-day, which can turn out enough meal to supply a small city for a year. It sings the song of fire from the first burning tree at which a man warmed his hands to the fire in the kitchen stove over which the oatmeal we had for breakfast this morning was cooked.

That bowl of oatmeal is not merely the pleasant breakfast food which we eat without thinking at all of what it stands for. It is one of the little footnotes to the history of the human race.





THE GROWING OF THE GRAIN

The Wind

Who is it helps the grain to grow?
“We do,” said the winds that blow.
“We stir the brown and ancient earth
In which the good grain has its birth;
We grind the mighty rocks to sand
And scatter them across the land;
We rouse the lazy clouds that lie
Within the pastures of the sky
And drive them over fields of grain
That need the gentle touch of rain.”
Who is it helps the grain to grow?
“We do,” said the winds that blow.

The Snow

Who is it helps the grain to grow?
“We do,” said the ice and snow.
“We cover up the frozen ground
With fleecy blankets tucked around
The little seeds with drowsy eyes
Who dream of May and summer skies;

The little seeds of grain who keep
The thought of April in their sleep.
We wrap them safe and snug and warm,
Protected from the winter storm."
Who is it helps the grain to grow?
"We do," said the ice and snow.

The Rain

Who helps to grow the springing grain?
"I do," said the gentle rain.
"I bring the little waking seeds
Water for their growing needs;
I give the white and hidden roots
Water for their bodies' fruits;
And when the sun in hot July
Burns across the meadows dry,
I bring the blessed cool reprieves
Of water for the thirsty leaves."
Who helps to grow the springing grain?
"I do," said the gentle rain.

The Sun

Who is it quickens growth begun?
"I do," said the golden sun.
"I fill the leaves with sunlight power,
Fill the roots and fill the flower,
Fill the seeds and fill the stem,
And that is how I quicken them.

In all the world the plants alone
Can make my energy their own
And with it build the living food
To feed the hungry multitude."
Who is it quickens growth begun?
"I do," said the golden sun.

The Air

Who is it helps the sun and rain
Grow the lovely springing grain?
"I do," said the air tight curled
About the roundness of the world.
"All the green leaves everywhere
Take the gift I have to share.
Part they use for growth and flower
With the help of sun and shower.
Part they give me back again
For breath of animals and men.
And so I help the sun and rain
Grow the lovely springing grain."

The Earth

Who helps to grow the springing grain?
"I," said the earth on hill and plain.
"When the roots come poking down
Through my larder cool and brown,
Little roots from bursting seed,
They will find the food they need,

Food to grow a stem and leaves,
Food to swell the yellow sheaves,
Food to fill the shining pot
With a porridge piping hot."
Who helps to grow the springing grain?
"I," said the earth on hill and plain.

*Kind and friendly things are these:
The sun that shines on land and seas,
The old brown earth, the springing grain,
The green and searching April rain,
The softly falling winter snow,
The little winds that sing and blow.*



THE FARMERS

THE WANDERERS

ONCE upon a time in the history of the world there were no farmers at all. In those far-off days men were hunters. They had learned to tip strong sticks with sharp-edged flints and with these they killed wild birds and small animals. They made hooks of bone with which to catch fish. They hunted the great mammoth, the wild horse, the reindeer, the bison and the rhinoceros with enormous stone clubs. They gathered fruits, mosses and roots to eat.

While the fathers were out hunting, the mothers kept house in their caves, or huts made of branches. They took care of their children. They made clothes by sewing together the skins of animals with bone needles and threads of sinew. They cooked the food.

In those day long and long ago, men took what the earth gave them and never tried very hard to make the earth give them food. They picked up what they could find, and killed what animals

they could without too much trouble. One day they might have plenty of food and the next day none. They were afraid of storms and the dark. They were happy in the sunshine. As they were always hunting for things to eat they moved from one place to another. They had no settled place to live as we have. When they had picked one place bare of fruits and roots and nuts, and had killed or scared away all the animals good to eat, they moved to another place.

THE TAMERS

The first great discovery made by men and women was that of the use of fire. The control of fire made men and women more than a match for all the other animals. It was the very first step in the march of civilization.

The next great step forward was the taming of plants and animals. It took many hundreds of years to do this. No one knows how the people of earth first found out that the seeds of wild grasses are good to eat. No one knows when they first began to plant grain for themselves instead of going out to look for it here and there on the hills and plains. No one knows how they

learned to tame animals, the cows and horses and sheep and pigs which have meant so much to people all through history.

We have seen that before men and women became tillers of the soil they wandered from place to place. We call these wandering people nomads. When the nomads learned that grain is good to eat they gathered it at first wherever they found it growing. Later they sowed grain in certain places and left it to grow as best it could. They came back when the grain was ripe, to harvest it. But very often the crops planted and not taken care of failed. The people who lived in those days did not think very much, but even *they* could see that a field of grain carefully tended would feed more people than a field where the birds and weeds were allowed to have their way.

THE FIRST FARMERS

So people began to settle down in villages where they could take care of their crops. The women and children usually worked in the fields. For a plough they used a crooked stick with which they stirred up the soil. They scattered

the seed on the earth and scratched it in by dragging a tree branch over the field. Until the seed sprouted the children had to scare away the birds who were always on the lookout for a meal of grain. When the grain was ripe the women cut it with stone knives or sickles made of earthenware. They beat out the grain from the straw and stored it away in their huts. Now when the men all went off to war or on long hunting expeditions the women had good food for themselves and their children. When game was scarce, when the winters were long and bitter cold there was grain to parch over the hot coals or to boil in the pot.

Grain became very important in men's lives. The growing of grains was one of the chief reasons why men came to settle down. They learned that to reap a good harvest it was necessary to stay where the crop had been sown and to take care of it. The settled folk who grew grain best, had to defend their fields against the men who still roamed over the earth. War was always going on between the dwellers in the valleys, and the fierce wandering nomads who envied the riches and comforts of the men who tilled the soil.

THE LAKE DWELLERS

We know something about the life of early farmers from the remains of the Swiss Lake Dwellers.

The Lake Dwellers lived in villages in Central Europe where Switzerland is now. To protect themselves from enemies and wild beasts these people built villages right out in lakes on platforms raised above the water. The houses were made of twigs woven together and plastered over with clay. A bridge was built from the platform to the mainland. Over this bridge the children drove the cattle to pasture. They had many tame animals, dogs, cows, pigs, goats and sheep. They had learned to milk the cows and goats. This milk they kept in rough earthenware pots, for they had pottery.

Over on the mainland were patches of ground planted with wheat, barley, millet, and flax. They had peas and crab-apples, and oats, too, as grains of oats have been found in the remains of the Swiss Lake Dwellings. This is the first appearance of the oat grain in history. For a hoe the Lake Dwellers probably used an animal's horn tied to a stick. Their ploughs were still the



THE SWISS
LAKE DWELLERS
FIRST USED OATS



crooked branches of trees which the very first farmers used. They had flails with which to beat out the grain from the dried grass. They roasted grain and stored it in pots to be eaten when needed.

The clothes of the Lake Dwellers were partly made of the skins of animals and partly of linen, for they grew flax and knew how to spin and weave.

Those old Lake Dwellers lived healthy lives. Their food was varied and wholesome. They had milk, grains with which they made round flat slabs of bread, and fruit, fish and meat. They had plenty of exercise, and fresh air and sunlight.

FARMERS IN MESOPOTAMIA AND EGYPT

The two greatest farming countries in the ancient world were Mesopotamia and Egypt. These two countries were the first to become civilized. Food was so easy to get, especially grain foods, that men could spend part of their time in thinking how to make life more pleasant. Every year the rivers in these countries rise over their banks and spread out on the fields. When

the water finally leaves the land, it leaves behind a coating of rich dirt. For this reason Egypt has been called the Gift of the Nile, and Mesopotamia the Country Between the Rivers.

The River Nile starts to rise in June, when the heavy rains begin in the mountains of Abyssinia. These rains last from June to September. Toward the end of July the river swells to a mighty sea which covers the land with muddy waters. High water mark is reached in September, then the cities and towns built on higher ground look like islands in a vast ocean. Late in October the water begins to sink until by December or January the river is back within its proper banks once more.

In the old days when the water had drained from the land leaving behind the gift of a coating of rich dirt, the overseers on the Egyptian farms woke their slaves early in the morning with the cry, "Make ready the seed grain and the oxen for the land has come forth." Out into the clear blue Egyptian dawn went the slaves with the clumsy wooden ploughs, the lumbering oxen, the sacks of golden seed grain. When all was made ready, the ploughman, holding the

handles of the plough with both hands, struck the ploughshare into the good black earth. The oxen lurched forward, slowly as is the way of oxen. Beside the plough walked men armed with stones and whips to urge on the animals. Slaves came behind the plough and smoothed out the furrows with wooden hoes. Next came the sowers. The seed grain was flung over the field by hand. Afterward the seed was pressed into the soil by sheep driven out over the fields.

At harvest time slaves cut the grain high on the stalk with short sickles and tied it up in sheaves. Then it was carried to the threshing floor where the grain was trampled out by the hoofs of oxen. The women winnowed the grain by tossing it into the air on small wooden boards. The wind blew away the lighter chaff and the grain fell on the floor. The grain was then stored away in granaries which had holes in the top through which the grain was poured from bags, and holes near the bottom where the grain was taken out as needed.

Farming in Mesopotamia was very much like that in Egypt. In both countries it became the chief occupation of the working man.



PLOWING
AND SOWING
IN ANCIENT EGYPT



Grain was so important in Mesopotamia that barley was used in many cases, instead of money, as a medium of exchange. Only two substances could legally be used in lending, barley and silver. Barley was also the main food of both men and animals, so much so, that not only the wages of laborers, but the hire of plough animals and even the salaries of certain officials were payable in barley.

The methods of farming in the highly civilized countries of Egypt and Mesopotamia were not much different from the methods of the much more backward Lake Dwellers. Their rivers gave the farmers fresh soil each year so that they did not have to bother their heads about improving the land. They also had plenty of slaves to do all the hard work which the rude tools made necessary. The only really new farming method which they invented was irrigation.

They dug canals which carried water from the rivers far into the country. In this way their farm lands were greatly enlarged. Besides adding many miles to their land and more grain to their stores, this invention proved to be a lasting benefit to agriculture throughout civilization.

THE TRADERS

Instead of improving their farm tools the people of Egypt and Mesopotamia used their free time in improving their ways of living. They built great cities. Their ships and their caravans journeyed to, and traded with far countries. In return for grain, the raw materials for many great industries were brought to Egypt and Mesopotamia from other lands. Many of the industries which we have today were practiced by those ancient people. They made glass and paper and cloth and dyes. They carved beautiful designs on silver and gold. They painted pictures. In Egypt they built the mighty pyramids. In Babylon they made the wonderful hanging gardens which were one of the seven wonders of the ancient world.

These great civilizations were made possible because it was easy for people to gain a living through farming.

THE FARMERS OF GREECE

Across the sea from Egypt lies a mountainous little peninsula which is now called Greece. When the men of Egypt and Mesopotamia were

dressings in purple and fine linen, the inhabitants of Greece were clad in the skins of wild animals. When the boys in Mesopotamia were learning to write the alphabet on clay tablets, the boys of Greece were learning how to kill game animals with great bronze axes. The uncivilized inhabitants of Greece must often have stood on the high promontories which overlook the sea to watch the great oared galleys of the Egyptians crawling across the violet-blue of the Adriatic.

One of our first records of the early civilization of Greece are the two poems, the *Iliad* and the *Odyssey*, which the Greeks believed a blind poet named Homer had composed. The *Iliad* describes the war which the Greeks waged against the city of Troy. The *Odyssey* tells the story of the wanderings of the Greek hero Odysseus after the fall of Troy. We know from these two poems that the Greeks were tillers of the soil in the Homeric age. When Odysseus was summoned to go with the Greek army to make war on Troy, he did not want to go. To avoid going he made believe that he was insane. He sowed a field with salt and ploughed it with a plough drawn by an ox and an ass yoked together. However, a

man named Palamedes discovered this trick by placing the infant son of Odysseus in front of the plough. Of course Odysseus turned the plough aside to avoid hurting his little boy and this proved that he had full possession of his wits.

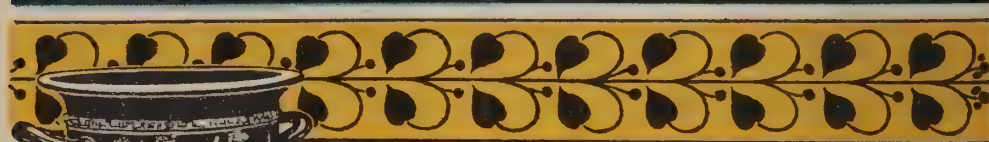
In the time of Odysseus, wheat or barley pounded or ground into meal seemed to furnish the basis of the diet of the Greek people. Grain was grown in the valleys, but as the Greeks had no kindly rivers which flowed out over the soil to enrich it, the crops were usually small. Much of the farm land of Greece was won by the draining of lakes and marshes. The land was watered in many places by digging canals from the brooks and rivers which come rushing down from the mountains.

On the slopes of the mountains grew the grape vines and the olive trees. The cultivation of the vine and the olive was one of the main occupations of the Greek farmer. Indeed the story runs that Athens, the most famous city of Greece, was named because of the gift of the olive tree to mankind. Athena, the goddess of wisdom, and Poseidon, the god of the sea, both wanted to rule over the city. All of the gods decreed that it

should be awarded to the one who gave a gift most useful to mortals. Poseidon struck the earth with his trident and out sprang four beautiful black horses. This was his gift. Then Athena struck the earth with her staff and a silver-leaved olive tree covered with fruit came forth. The gods decided that Athena's gift was the more useful of the two and so the city was awarded to her. Of course, this is only a legend.

THE COLONISTS

The population of Greece grew rapidly. It soon came to pass that the grain grown on the Grecian farms was not enough to feed the people. This meant that the Greeks had to go to other places for food. They became great colonizers. Groups of people went to the shores of the Black Sea, to North Africa, to Sicily, to Southern Italy, where they founded colonies entirely independent of the country from which they had come. However, the colonists always kept their love for the mother land. They traded with her. They helped her in time of war. They called themselves to the end of their lives "the men away from home."



CARRYING GRAIN
TO ATHENS

Many of the legends of Greece are about the adventures of the first seafarers and colonists. We read of Jason, who built the great ship called the *Argo* and went in search of the treasure of the golden fleece with fifty companion heroes. He found the golden fleece on the shores of the Black Sea. The land about this sea became one of the greatest grain-growing countries of the ancient world.

We read of Cadmus, who went in search of his sister Europa, who had been carried off by a white bull. He was told to follow a cow which he should find in a field and to build a city where she lay down to rest. The cow led Cadmus on a long and wandering journey. At last she lay down near a cave where an enormous fire-breathing dragon dwelt. Cadmus slew the dragon, and then in obedience to a command of the gods, he pulled out the dragon's teeth. He ploughed a long furrow and sowed the teeth of the dragon. The strangest crop ever grown sprang from the dragon's teeth. No sooner were they sown than the clods of earth began to move and the points of spears appeared above the surface of the ground. Next helmets with nodding

plumes came up, and next the shoulders and the breasts and limbs of armed men. The harvest was a body of warriors in full armor. As soon as they were free of the earth they began to fight among themselves until only five were left. These five threw down their arms and helped Cadmus build his city.

From the colonies which her children had founded Greece imported most of her grain. In the 5th and 4th centuries before the birth of Christ the importation of grain was the most important business of Athens. The home farmers could not begin to raise enough grain to feed the citizens and the slaves, who crowded the city. One of the chief concerns of the government of Athens was to guard against the failure of the grain supply from abroad. If this supply were cut off a great famine would be the result.

THE FARMERS OF ROME

The story runs that Rome was founded by Romulus and Remus, twin boys who were taken care of by a wolf after they had been left in the woods to die by order of a wicked great-uncle. Romulus and Remus, the legendary founders of

Rome, got their dispositions from their foster-mother the wolf. They were warlike, quarrelsome and fierce. They and their companions, who were also warlike, spent their time in fighting and in hunting. They scorned tilling the soil. This story is probably founded on dim memories of the wild life of fierce wandering tribes who afterward settled down and became tillers of the soil.

The founder of Roman agriculture according to legend was Numa Pompilius, the second king of Rome. He was a wise and good man. Instead of letting his people occupy themselves continually with military exercises, as Romulus had done, Numa distributed to all his subjects fields to cultivate and tools for working the soil. Numa thought with truth that agriculture is the first of all the arts, not only because it feeds mankind, but because the tillers of the soil are almost always producers and not destroyers.

After Rome had become rich and great; when she was mistress of the lands about the Mediterranean; when all the little peasant farms had been abolished and the land held by a few wealthy landowners, the poets, the philosophers

and the story-tellers looked back wistfully to the early days of Rome. Story after story those citizens of the mighty empire told of the struggling little city encircled by its tiny farms. They told the story of Cincinnatus, the owner of two or three acres of land outside the city wall, who was called from his plough to save the Roman army from defeat, and who went contentedly back to his farm after fourteen days of glory. They told the story of Horatius, who held the bridge over the Tiber against the army of Lars Porsena of Clusium, and who claimed as his only reward all the land that he could plough about in one day.

They told tales of the farmer boys from the little two and three acre farms who helped to make Rome great. These boys lived healthful lives. They were up at dawn working with their fathers in the fields. They took frequent baths in the mountain brooks. They ate simple food, porridge, vegetables, milk and occasionally the flesh of the animals which they had killed while out hunting. These boys were equally at home with the farm mattock, the hunting spear and the battle axe. At the call to war they dropped

their mattocks and put on their armor. When the war was over they came marching home again and took up their farm tools. They had little desire for personal glory. Their small farms and their beloved Rome were the two great things in their lives.

THE FESTIVAL MAKERS

The principal crop raised by the old Roman farmer was grain. To purify the crops from evil influences a religious procession marched about the land of each farmer in the latter part of May. Here is the calendar of a Roman farmer for the month of May.

The month of May.

XXXI days.

The nones fall on the 7th day.

The day has $14\frac{1}{2}$ hours.

The night has $9\frac{1}{2}$ hours.

The sun is in the sign of Taurus.

The month is under the protection of Apollo.

The grain is weeded.

The sheep are shorn.

The wool is washed.

Young steers are put under the yoke.

The vetch of the meadows is cut.

The purification of the crops is made.

Sacrifices to Mercury and Flora.

What fun those May festivals must have been for the boys and girls on the Roman farms! On the day before the blessing of the fields they went to the woods to gather flowers and to break off the olive branches which were to be carried in the procession. Back home again they wove the flowers into garlands. On the day of the festival they hung the dewy flower garlands about the necks of their father's most valuable ox, sheep, and pig. Then came the great procession waving olive branches and singing the festival song. The ox, the sheep and the pig were put at the head of the procession. Perhaps the children were allowed to lead them. Three times the procession went singing about the land. The sweet smell of the upturned earth perfumed the air; birds' wings went flicking against the sun; storms and disease, the two great perils of the grain crop, seemed far away on that joyous day. And then after the third round the songs were hushed. The head of the household stepped to the altar and said this solemn prayer: "Father Mars, I pray and beseech thee keep, avert and turn from us all disease, seen or unseen, all desolation, ruin, damage and unseasonable in-

fluence; I pray thee give increase to the fruits, the corn, the vines and the plantations and bring them to a prosperous issue. Keep also in safety the shepherds and their flocks, and give good health and vigor to me, my house, and household."

FARMERS OF THE ROMAN EMPIRE

No wonder the poets and the story-tellers mourned the passing of the simple life of the early farmers. Roman citizens who had become very rich bought up the little farms and joined them together in great estates. Very often a rich man would lend a farmer money and when the latter was unable to pay back the loan, the rich man took the farm. The small farmers who lost their land in this way were often men who had been unable to make their farms pay because they had been obliged to leave their land and serve in the army.

One reason for the decline of grain farming in Italy was the importation of grain into Rome from the rich grain lands of Sicily and Egypt. In Sicily these grain lands had been appropriated by rich men and scheming politicians who farmed

them with slave labor. As a result the markets of Rome were flooded with cheap grain. Grain became so cheap that the farmers who still owned small pieces of land could not get enough money for the grain they raised to support their families and pay their taxes. They were forced to turn their farms over to the rich landowners. These wealthy men used a large part of their great estates for sheep ranges and cattle pastures. On the land of Italy slave gangs working under overseers took the place of the old Roman farmers, the very backbone of the state.

The farmers, after their land had been lost, went within the city walls, leaving the scythe and the plough. They worked now and then at a small wage. They ate mostly bread made of wheat which was distributed to them by any politician who wanted their votes at an election. They lived in great lodging houses three or four stories high.

The land itself had become very poor. There were no great rivers as in Egypt and Mesopotamia, to spread over the land each year a new and fertile soil. The Romans solved this problem in some measure by using fertilizers and by

the rotation of crops. This meant that one year they sowed grain on a patch of land, and the next year a green crop such as beans, peas, clover, vetches, lupine or alfalfa. This green crop was usually ploughed into the soil, and the following year the land was allowed to stand idle (fallow). By plowing in the green crops the land was enriched with nitrogen and with the bacteria necessary for the growth of grain. By using the rotation of crops the Romans became the first scientific farmers.

Farm tools, such as the plough and the harrow, were very clumsy. The use of slaves meant that the land was badly worked because usually the slaves did as little as they possibly could unless they were under the eye of the overseer. The result was that even by using the system of rotation of crops the grain yield was very low. Usually only four times the seed planted was reaped at the harvest.

OATS IN SCOTLAND

The island of Britain was unknown to the Romans until Julius Caesar came over from Gaul with an army and overran it sixty years before

the coming of Christ. In the South dwelt the Britons and in the North dwelt the Picts and Scots. From Caesar's time onward Britain was an outpost of the Roman Empire.

At that time the island was covered with great forests. The Roman legions went tramping, tramping toward the North, conquering the people as they went. The golden eagles of Rome were set as far north as the Firths of Forth and Clyde, and the Britons and Picts and Scots were cooped up in the north country.

At last the Romans found that it was dangerous to go too far north. That country which we now call Scotland was full of swamps and forests where it was easy for men who didn't know the ground to lose their way. So instead of trying to conquer Scotland the Romans built a great wall across England to keep the Picts and Scots out of the part of the country they had conquered. The Romans called the Picts and Scots, the Painted People, because they dyed their bodies with colored juices.

At that time the people thought oat plants were just weeds. The oat grains were very small and dark and no one thought of eating them. We do

not know just how the Picts and Scots came to find that those little black seeds were good to eat. Perhaps in those fearful times when the people of Britain had to burn their houses and take to the hills and forests to escape the Romans they ate anything they could find to keep themselves from starving. Of all the wild seeds that they gathered they may have liked the oat grains best. They probably made the first oatmeal by crushing the grains between stones and found that this meal made a cake as good as the cakes they used to make of wheat from the lowlands.

The main food then of the Picts and Scots was oatmeal. When they set off through the heather to gather honey or to tease the Romans on the wall with their little whizzing arrows they took with them a handful of oatmeal. When it was time to eat they mixed the meal with water and ate it raw. They never lighted fires except near a village. In those days the Picts used fires in the open country only to signal to each other.

But when they were safe in their villages or in the deep forests they made the oatmeal into cakes which they baked before the open fire, or they boiled it into porridge. It was more than a



God spede þe plow: ⁊ sende us korne

IN THE
MIDDLE AGES

thousand years after the Picts and Scots began to eat oatmeal that oats became one of the most important grain crops.

So we see that although oats were used by the Lake Dwellers in Central Europe, they did not become an important food until they were eaten in Scotland hundreds of years later in the dark days of the Roman conquest.

FARMERS OF THE MIDDLE AGES

The Roman Empire was destroyed when down over Europe the barbarians came flooding. At first the whole European world was in chaos. Then some order was established when weaker men put themselves for protection under stronger men. Weak men surrendered their freedom to save their lives. In this way rose the great feudal system of the Middle Ages.

In those times there were castles with high towers and strong walls. Knights in shining armor with crosses on their shoulders went to Palestine from England, France, Germany, Austria and Italy to win the Holy Land from the Saracens. Lovely ladies sewed with silk and golden threads in the castle hall and rode beside

the knights with falcon on the hand to hunt the birds of the air and the beasts of the forest. But the poor peasants who tilled the land for the knights had a very hard time of it. They lived in mean little huts in villages near the castle walls. They worked in the fields from morning till night. The crops were very poor because the peasants didn't know much about farming. Sometimes just as a waving oat field was ready to be cut an army of knights and archers tramped over it as carelessly as they would march down the highroad.

The great barons who held the land had no time to give to farming. They left it all to the ignorant peasants. The farm land about each castle was divided into three great fields without hedges or fences. Ridges of unplowed grass divided each one of the fields into long narrow strips of about one acre each. To each peasant from ten to thirty of these strips were allotted. The baron also had strips of his own in each one of the three fields which the peasants were obliged to work for him two or three days a week. The curious thing about this system was that no man's strips lay all together. They were

scattered hit or miss through all three fields and the peasants lost a great deal of time going from one strip to another. For hundreds of years farming was held back by this "three-field" system.

A rude rotation of crops was practiced. All the strips in one field were planted one year with wheat or some other winter grain, the next year with spring grains such as oats or barley; and the third year nothing was planted on them. Thus one third of the land was always idle.

So wasteful was this method of farming, and so crude were the tools of the peasants that famines were very common. Not every peasant owned his own plough. Often he had to borrow or hire it from his neighbors or break up the ground with a clumsy mattock. What ploughs did exist had wooden ploughshares. The grain was beaten out in some places by flails but in others the old method of having it tramped out by cattle still existed.

A PEASANT CALENDAR

From old stories and songs we know something of the calendar of peasant life in the Mid-

dle Ages. In January the peasant rested and feasted. February was a dull month; he sat at home by the fire. In March he looked after the vines. April was for him the best month in the year. The grain began to sprout and the peasant pruned the vines. In May, while the baron hunted and hawked, the peasant rested in the shade. In June he was busy with the haymaking, in July and August with the harvest, and in September with grape gathering. In October the wine was made and the fields sowed. In November he took the pigs to gather acorns in the forest and cut his store of wood for the winter. Then at Christmas there was feasting again.

Each peasant had a house alone in its little field, shut in with an old thorn hedge and a ditch bridged by a plank. The cottage had three separate buildings; one for grain, one for fodder and one for the family. Inside the dwelling house a fire of peat and fagots crackled in an immense fireplace. The smoke escaped through the open door or through cracks in the wall. On one side of the room were a pothook on which to hang the kettle, a three-legged stool, a shovel,

heavy andirons, a saucepan and a ladle, an oven, and next to it a huge bed in which the whole family slept. On the other side were a cupboard, a table, a bench, a cheese-press, a crock and some baskets. Besides his household furniture the peasant owned a mortar for pounding grain, a ladder, fishing tackle, hedging gloves, a plough, a billhook, spade, knife, shears, harrow and a little cart. He had a small garden with a dog for watchman, and at least one cow.

This is a song about peasant life in the Middle Ages:

SONG OF THE MANOR

My lord flings out his banner
Over a goodly manor.

He hath two mighty castles,
And half a hundred vassals.

He hath a wood of oak
Where porkers root and poke.

He hath a meadow wide
Where cows and sheep abide.

His mill hath a water wheel
Which grinds the peasant's meal.

He hath an oven red
Which bakes the peasant's bread.

He hath six hides* of soil
Where peasants delve and toil.

And I his humble vassal
Have mud hut for a castle.

I rise at song of lark
And labor till the dark.

My feet are black with soil
My hands are hard with toil.

But where would my lord be
Without the men like me?

Who would sow the barley
In the morning early?

Who would cut the wheat
In the August heat?

Who would tend the swine?
Who would milk the kine?

See the lord go by
On his war horse high.

*A hide is a measure of land used in the early times in England. It is supposed to have been the equivalent of 120 "acres," or 120 times the amount of land which a plough team of eight oxen could plough in a single day.

Fifty in his train,
Tramping on the grain.

Ah, my lord, my lord,
Where would be your sword?

Where would be your arrows
Without our ploughs and harrows?

Where, your armor coats
Without the wheat and oats,

The goodly grain forever growing
In your acres of our sowing?

THE BLACK DEATH

Time jogged along in this way year after year. Wars, starvation, a little peace, a little plenty, touched the lives of the patient peasants, and then passed on, leaving no change behind them. And then a terrible thing happened. A dreadful disease called the Black Death spread over Europe in the middle of the 14th century. It destroyed at least one third of the population of Europe in four years. A French monk wrote, "It is impossible to believe the number who have died throughout the whole country. Travelers, merchants, pilgrims declare that they have

found cattle wandering without herdsmen in fields, towns and waste lands. They have seen barns and wine-cellars standing wide open, houses empty, and few people to be found anywhere. In many towns where there were before 20,000 people, scarcely 2,000 are left. In many places the fields lie uncultivated."

The Black Death helped to break up the crude system of farming in the Middle Ages. Peasants ran away from the estates of their masters to the cities. There they could hire themselves out for more money than they had ever had before, because of the scarcity of labor. The few farm laborers who were left demanded high money wages for their work. As a result, many of the great landlords in England began to fence their lands and turn them into sheep pastures. One man could care for a flock of sheep whereas it used to take twenty or thirty men to farm the land over which the sheep grazed. Sometimes the landlords rented out their land to tenant farmers.

Gradually the whole system of farming changed. The farmers now took a great pride and interest in their land because they owned it

or rented it and could do what they liked with the grain and other produce which they raised. They owed neither services nor produce to any man. They either paid a lump sum for the land, or a fixed money rent each year. The growth of towns and cities furnished a market for their produce. They now had money to jingle in their pockets with which to buy little comforts and luxuries at the fairs and in the city markets. They learned much better farming methods and had money to buy necessary tools.

However, even after they had won their freedom from the great barons and owned or rented the land they tilled, the farmers were held in contempt by the fine ladies and gentlemen of court and castle. They never had much education. Most of them could not read or write. They were taxed severely to provide for the luxuries of the king and the noblemen.

In the 18th century, before the French Revolution, a peasant farmer in France did not dare to put a new roof on his cottage or show any other sign of prosperity for fear that the agents of the king would increase his taxes. Famines were frequent. Sometimes the peasants made

bread of chaff and roots; they even ate the bark of trees. When Marie Antoinette, the Queen of France, was told that the peasants had no bread she said, "Let them eat cake."

It was in the new world of America that farming regained its lost dignity. Today we look back upon the pioneers who hewed their little homes out of the wilderness much as the Romans of the Empire remembered with pride the founders of their state.

THE PILGRIM FARMERS

In November, 1620, the Pilgrims landed on Cape Cod. In their explorations of the country they discovered fields which the Indians had cultivated. In one place they found in a heap of earth which they opened two baskets containing four or five bushels of Indian corn. They took as much as they could carry in their pockets and in a kettle which they had brought along. On another exploring trip they found another parcel of corn and a bag of beans.

On December 11th the pilgrims landed at Plymouth. It is written, "On Monday they rounded the harbor and found it fit for shipping

and marched also into the land and found divers cornfields and little running brooks, a place as they supposed fit for situation; so they returned to their ship again with this news to the rest of their people which did much to comfort their hearts."

In the early spring, after a long hard winter, the Pilgrims opened the ground near their dwellings with spades and prepared their rude gardens. They sowed six acres of ground with barley and peas. Twenty more acres were sown with the Indian corn which they had found on their exploring trips into the country. Squanto, a friendly Indian, showed the Pilgrims how to plant the corn in little hills. He showed them also how to fertilize the soil by dropping a fish into each hill with the corn.

As the spring advanced the Pilgrims found wild grapes and berries in abundance and in their records we find them telling also of the fragrant many-colored May flowers which the children found in the woods and clearings.

In the fall the Pilgrims began to gather in their small harvest. The peas had turned out "not worth the gathering" as the sun had parched

them in the blossom, but the barley was "indifferent good," and there was a good increase in the Indian corn. After the harvest each person in the Colony was allotted a peck of corn meal a week to last through the coming winter.

THE FIRST THANKSGIVING

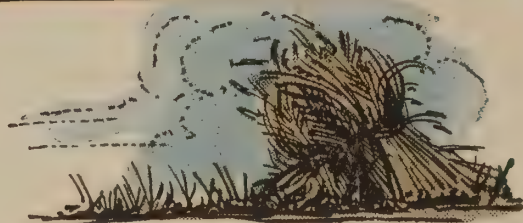
In order to celebrate the harvest a day of Thanksgiving was appointed. Hunters were sent out by the governor to shoot wild turkeys and deer for the feast. Fishers caught great supplies of cod and bass. Juicy oysters and clams were dug out of the wet sand on the beach.

Massasoit, a neighboring Indian Chief, and ninety of his people were invited to the festival. They came bringing a gift of five deer. For three days the Pilgrims entertained and feasted their guests. On that first Thanksgiving day the men, women and children of the tiny colony rejoiced in the good store of grain laid up in their huts.

After the almost universal sickness of the first winter, health was restored with the fresh foods and warm sun of spring and summer. Fires were burning on their own hearths. In good



REAPING AND
BINDING OATS
IN AMERICA



heart and hope the lonely company clinging to the little spot of land which they had won between the wilderness and the sea, settled down to await another winter.

MODERN AMERICAN FARMERS

When the Colonists came over to America they were still using the crude tools of their ancestors. After thousands of years of farming the men who tilled the soil were still using clumsy wooden hoes and wooden ploughs. The pioneers cut down the trees and sowed Indian corn among the stumps. They ground the corn into meal on the top of the stumps. Today a farmer in the broad plains of the west can cultivate a thousand acres of grain fields as easily as the men before the American Revolution could cultivate fifty.

The great advances which the American people have gained in farming were made possible by the character of the men who cultivated the soil and by American inventive genius. In the countries from which the Colonists came we have seen that farming was looked down upon. The men who actually tilled the soil were considered to be peasants. But in America, from the first,

the farmers have come from the same homes as the ministers and lawyers and doctors and business men. They have had the same education and the same training. For this reason the farmers brought mental activity and alertness to the work of the farm.

But even the high intelligence of the American farmer could not have brought about the wonderful methods of farming today without the mechanical genius of the American inventors. The greatest strides forward in the invention of labor-saving devices on the farm came after 1859. Since that date most of the tools used in farming today were invented.

In Egypt the plough was a wooden wedge tipped with iron fastened to a handle. Today the farmers have great gang ploughs which can turn ten to twenty furrows at a time. In Egypt slow lumbering oxen dragged the plough. Today we have powerful tractors. The first harrow was the branch of a tree which was dragged over the ground to cover the seeds after sowing. Today we have great disk harrows with iron teeth. For thousands of years men sowed their seed by hand; they loosened the earth about the young

plants with hoes; they cut the ripe grain with sickles; they beat out the grain with flails. To-day the farmers have mechanical seeders, mechanical cultivators, and harvesting machines which do the work of an army of men. The threshing machine today with a few men to work it does in two or three days what it used to take all winter to accomplish on the threshing floor with a flail.

It has been calculated that the farmer today can accomplish twenty times as much in the time that he works as the farmer before the Civil War. In one half hour the farmer today can sow as much grain as his grandfather sowed in ten hours. In one hour he can harvest as much grain as his grandfather harvested in forty-seven hours. The result of all this is that grain production has increased enormously in the United States.

In the old days little sailing vessels crept timidly across the Atlantic from the old world to the new. They bore the men who were willing to dare the dangers of an unknown land and an unknown sea for the sake of gold, or new trade routes, or pure adventure, or the right to wor-

ship as they pleased. Some of these ships carried in their holds bags of seed grain and crude farming tools for the men and women who meant to try their fortunes in the new land. Not even the handful of beans which Jack of the Beanstalk received in exchange for his cow produced such a harvest as those bags of seed grain. Year after year for over three centuries the oats and wheat and barley in those bags have multiplied. Now the narrow ocean lanes of the pioneers have become a wide ocean highroad over which the great ships of the new world take a share of each harvest to the old.

One of the most important crops in our yearly grain harvest is oats. Our country grows more oats than any other country in the world. The average amount of land each year devoted to oats in the United States in the years 1918–1922, was 42,677,000 acres. The average production of oats each year during that time was 1,302,454,000 bushels, with a value of about \$683,411,000.

USE OF OATS AS ANIMAL FOOD

Most of the oat crop of the United States is fed to animals on the farms where it is grown. Oats

have long been the staple grain for feeding horses. The high protein content furnishes a large amount of muscle-building material for the growth of young animals and for keeping the older ones in good health. Most of the protein and fat in the grain is digestible and complete mastication and digestion are aided by the presence of the large amount of crude fiber in the hull.

USE OF OATS AS HUMAN FOOD

We have seen that oats have been used as human food in northern Europe for many centuries. In Scotland oatmeal porridge, or groats, is one of the main articles of diet. Hull-less oats are largely used as food in the mountainous districts of China, where the grain is not only used as porridge but is ground into meal and used in the making of bread and cakes. In the United States the manufacture and consumption of oatmeal have greatly increased in recent years. Oatmeal when properly cooked is one of the cheapest and best of the cereal foods.

The Iowa Agricultural Experiment Station found that the average price per pound of three

brands of oatmeal was slightly less than that of seven uncooked foods made from other cereals and little more than half that of seventeen brands of prepared cereals. Ten cents purchased a greater fuel value in the form of oatmeal than in the average of the other uncooked cereals, and nearly double that which could be obtained in the prepared cereals. The protein content of the oatmeal was greater than that of any of the other cereal foods. Similar results showing the high food value and comparatively low cost of oatmeal are reported by several other agricultural experiment stations. It is generally recognized that most of the protein in oatmeal is readily digestible and that oatmeal is a valuable addition to the diet.*

**Oats: Distribution and Uses*, U. S. Dept. of Agriculture, Farmers' Bulletin No. 420.



A MEDIEVAL
GRAIN MILL





THE MILLERS

The first mill was a set of teeth because when grain was first used by people as food it was eaten whole and raw. Then men learned that crushed grain is easier and pleasanter to eat. They first crushed grain as they crushed nuts. They placed the grain on one stone and pounded it with another. The coarse meal was first eaten raw; then mixed with water and dried in the sun.

THE HAND STONE

The first contrivance made by men especially to grind grain was the hand stone. This was the only mill used for about four thousand years. The hand stone was a hollowed-out stone in which the grain was placed and ground into meal by pounding it with a stone-crusher. These have been found in remains of Swiss Lake Dwellings.

THE SADDLE STONE

The first grinding mill was the saddle stone. It has been used throughout the world and among

some primitive peoples it is still in use. To make a saddle stone the upper part of a stone was hollowed out. In this hollow the grain was ground by means of another stone which fitted into the hollow. The grinding stone was worked forward and backward, not rolled or pounded.

The ancient millers of Babylon, Assyria, Egypt and Palestine used the saddle stone. In Egypt in the days of Joseph, the chief of Pharaoh's bakers was imprisoned and afterward hanged for making bad flour. The mill that he used was the saddle stone. The use of the saddle stone lasted through the days of Rome and Greece, although by that time newer and better processes of milling had been invented.

EARLY MILLERS

Women were the first millers because the grinding of grain was a part of the business of housekeeping. The Greeks were the first people to use men instead of women as flour-makers. These Greek millers were called pounders.

Two centuries before the birth of Christ, milling was considered to be menial labor and was often performed by slaves and criminals. In

Rome the people who ground the grain baked it also. Disobedient servants and slaves were punished by being forced to do the grinding. The making and baking of flour and meal was considered to be a part of the work of each household in Rome until a late period. In 167 B. C. the Macedonians were conquered by the Romans and some of the captives of war brought to Rome were a band of Greek "pounders." These men were set to work at their occupation of grinding and baking and this was really the beginning of milling and baking as a trade.

THE QUERN

In the first century after the birth of Christ the quern was invented in Italy. It was the first grinding machine in which the stones were mechanically combined. The quern was a *revolving* mill. It consisted of two stones, a lower and upper. The upper stone was shaped like a beehive and flattened at the bottom to fit the flat surface of the lower stone. A hole was made in the upper stone through which the grain was poured and a handle was inserted in the side so that the upper stone could be turned around over

the lower. The grain was ground between the two stones. Later, grooves were made in the grinding surfaces of the two stones. The edges of the grooves did the grinding and the hollows carried the ground meal to the rim of the stones.

The principle of the revolving stones on which the quern was founded is still in use today for the grinding of grain. The only changes made in almost 2000 years were changes in motive power and in various devices which have greatly improved the quality of the flour and meal. The first motive power used was that of women, slaves and criminals. Then cattle were used to turn the stones. The next step was the invention of water mills and these were used all through the Middle Ages and even down to the present day in some places. Water mills were used at an early period in England. The Roman soldiers who were stationed in England used to grumble because they thought that the water-ground meal of the Britons was not as filling as the rough meal ground in the Roman ox-mills.

In the early days of the American Colonies boys used to ride on horseback for miles, perched on top of a bag of grain, to some pioneer wind or

water mill where the family flour or meal was ground.

MILLERS OF THE MIDDLE AGES

During the Middle Ages each manor had a mill usually run by water power. The mill belonged to the baron who owned the manor and the peasants were obliged by law to have their grain ground in the manor mill. In payment they had to give about one bag of grain in every ten to the overlord. The peasants thought this was a great hardship as many of them owned hand-mills and could have ground their own grain without any expense at all. As a result quarrels were continually taking place between the peasants and the barons over the mill rights. The peasants used to grind their grain secretly and this led to a search for all privately owned hand-mills. Whenever the baron's officers found a mill in the possession of a peasant it was destroyed.

In many places an abbey or a monastery was the owner of a manor. This meant that the Abbot was the overlord of the peasants who lived in the manor. As a record of everything that happened was kept in the monasteries at that time, we have

many stories of the struggles between the peasants and the Abbot over milling privileges. One of these stories comes from St. Alban's Abbey in Cirencester, England. The quarrel started in 1274 and lasted for many years. The Abbot owned the milling rights for the whole town. He ordered the citizens to give up their treasured hand-mills. He said that in return he would see that his miller was strictly honest and would take no more grain in payment for grinding than was due. In case of any dispute he promised that the case would be tried before twelve jurors.

For about fifty years the townspeople submitted to this ruling. Then they rebelled and besieged the abbey. They forced from the Abbot a charter of liberties. Then they went back home and immediately set up their hand-mills again. The Abbot waited patiently for a chance to get back at the townspeople. The opportunity came six years later. The Abbot descended in force on the town, searched the houses, and captured the forbidden hand-mills. He took them all back to the abbey and used the grinding stones to pave his private room. Many years later the townspeople's turn came again. They dug up the

grinding stones and distributed them as trophies of their victory. But in a counter-raid on the part of the abbey the citizens' hand-mills were again seized. This ended the struggle. A money fine was imposed by law on the obstreperous citizens and henceforth they agreed to grind their grain at the abbey mill. This is only one instance of the merry battles that were waged between overlord and peasants over milling rights.

The grain ground in the creaking water mills of the Middle Ages made a very coarse meal. Oats, for example, were ground without being cleaned. The oatmeal was coarse and dirty, full of oat hulls and stubble and dry sticks. But it didn't matter to the boys and girls of that day that oatmeal was coarse and dirty because very often it was their only food. They didn't have many luxuries and when they were very hungry they probably scarcely knew whether their food was clean or not. Today everything possible is done to make oatmeal good to eat. How this is done will be told in the story of how oatmeal is made today. The world has learned so much since then about preparing foods, that we insist on having our cereals pure and delicious.

AN OATMEAL MILL TODAY

The making of oatmeal today is a great industry. Oats are shipped to the mill by railroad. As soon as they arrive the oats are tested to see if they are the right kind for making good oatmeal. Only the best white oats are used. If the oats are passed by the mill grain inspectors they are unloaded in the freight yards by powerful machinery. A whole car of oats is dumped into the receiving hopper in from 6 to eight minutes. The grain as it comes from the cars is very dirty. It is full of sticks, straw, weeds and even bits of iron. Before starting to make it into oatmeal it must be cleaned.

The cleaning house is a place full of machines all whirring and clacking together. Here the oats are weighed and then passed over giant magnets which draw out all the bits of iron and nails. Then the oats are passed through fans where the chaff is blown away. Next they are shaken in sieves and screens and all sorts of other machines for loosening the dirt and removing it from the oats.

After their dry cleaning only the choicest oats are left because some of the machines in the

cleaning house sift out the light oats. The light oats are discarded because only the plumpest ones are used for oatmeal.

The oats are taken next to the dry house. Here the oats are toasted in great pans about ten by twelve feet across. Each one of the pans holds about twenty-five bushels. It takes from forty to fifty-five minutes to toast the oats properly, and all the while men are testing each batch to see how much heat it needs to give the grain the right flavor. Then the toasted oats are passed over screens again and the dust is drawn out. The people in an oatmeal mill have to be very careful about dust. Almost every time something new is done to the oats any dust which may have been picked up in the process is drawn out.

Next come the grading machines. They separate the plump grains from the stubby and slim oats. The grading is very important because of the next thing that happens to the oats. This is called the hulling process. A hulling machine consists of two stones. The lower stone is fixed while the upper one revolves over it. The grinding surface of these stones must be kept flat and about as rough as coarse sandpaper. The stones

are set exactly an oat groat's length apart. An oat groat is an oat with its coat and whiskers off. The oat plant stores most of its sunlight energy and building materials in the groat, so we don't need the outside coat and whiskers. In the hulling machine Mr. Oat takes them off quickly. This is why we never find Mr. Oat's tough coat and his wispy whiskers in our oatmeal.

The oats pour through a hole in the upper or revolving stone of the hulling machine. Each pair of stones is set just wide enough apart to hull oats of a certain length. When they come from the grading machines the short stubby ones are all together, the long slim ones are all together and the plump ones are all together. The short ones go through a pair of stones set the least fraction of an inch closer together than the stones which hull the long slim ones. The oats move to the outer edge of the stones and here it is that Mr. Oat stands on his head most obligingly and has his coat and whiskers, or hull, taken off without hurting his inside.

Then the loose hulls are blown away by air which moves just fast enough to carry away the light hulls but not the groats. Heavy particles,

like broken groats, are sifted out in great shivering steel plates with holes in them.

As all the oats do not get their hulls taken off the first time they go through the stones the unhulled oats must be separated from the hulled oats. To do this they are sent over a belt about two and a half feet wide which is tilted up at a sharp angle. This belt, covered all over with a load of golden grain, moves slowly upward. The hulled oats are carried over the top, and the rest fall off at the bottom into a hopper. All the unhulled oats are sent back to go over the stones again, but the hulled oats or groats are now ready to be graded once more.

This is done to separate the plump groats from the slim ones and the short stubby ones. The selected plump groats are now ready to be steamed and rolled. At the steam chests the groats are put through live steam for about five minutes. This keeps them sweet and fresh. Unsteamed groats turn rancid very easily.

As the groats come hot and moist from the steam chest they are fed very carefully and evenly to hot metal rollers. These rollers flatten the groats out into the thin flakes which we know as

uncooked oatmeal. Last of all the rolled oats are dropped through a strong draft of air to take out all small light particles.

Now they are ready to be put into packages and go to the shelves of grocery stores. Wouldn't it be fine if all the mothers and fathers who come to buy oatmeal and all the boys and girls who eat it could see how carefully it is made?



THE COOKS

THE last chapter in the story of grains is the story of the cooks. They are the last ones in the procession of those who prepare our morning dish of oatmeal.

THE CONTROL OF FIRE

The very first important step forward taken by mankind was the discovery of the use of fire. We do not know how people learned to use fire but every race has had its stories to explain how this great gift came to the world.

The Greek legend has it that Prometheus and Epimetheus, two brothers who belonged to a gigantic race of gods called Titans, made man and the animals. Epimetheus had the task of giving to the animals the faculties necessary for their preservation. Accordingly he bestowed upon different animals the gifts of courage, strength, swiftness and sagacity. To one he gave wings, to another claws, to a third a hard shell for covering, and so on. But when he came to

man who was to be superior to all the animals, Epimetheus had given away all his gifts and had nothing left.

In this quandary he turned to his brother Prometheus, who then went up to heaven and lighted a torch at the chariot of the sun. In this way he brought down fire for man. With the gift of fire man could now make weapons with which to subdue the wild beasts. He could fashion tools with which to cultivate the earth. He could warm his dwelling so that he was more or less independent of climate. He could make his meat and grains more digestible and more tasty by cooking them.

This is only one of the many stories which have been invented to explain how men first came into possession of fire. What really happened we do not know. Probably men got fire first from burning trees which had been struck by lightning. Then, too at a very early period in history men learned to tip sticks with sharp-edged flints, and flints, when knocked together produce sparks. In this way men may have learned to make fire for themselves. Another way of making fire which men quickly learned was the rub-

bing of two dry sticks together. The North American Indians believed that various animals had shown their ancestors how to make fire—the buffalo by striking sparks from stone with his hoofs and the panther by scratching the rocky hillsides with his sharp claws.

FIREPLACE AND STOVES

The first fires used by man were open fires kindled in the place where the tribe was staying at the time. They were used for cooking, warmth and for keeping away wild beasts. Gradually people came to build rude fireplaces by piling up stones. The next step was the digging of the fire pit which was lined with stones.

The first houses were caves. The fireplaces in caves were made near the opening so that the smoke could escape out of doors. Getting rid of smoke was a great problem up to the 12th century after the birth of Christ. The Egyptians and Greeks and Romans warmed their houses and did their cooking mostly over charcoal fires which do not smoke. The charcoal was contained in a brazier, a metal container built to hold a fire. In Roman houses when fires were built indoors on

a hearth, a hole was cut in the roof through which the smoke could escape as best it might. In the cottages of peasants in the Middle Ages the door was made in two sections. The lower part was left closed to keep out the pigs and the upper part was left open to let out the smoke.

The first fireplaces with chimneys were made in the castles of the nobles of the Middle Ages. At first they were badly built but gradually men learned to make the perfect fireplaces which we have today. The baking in the Middle Ages was done in ovens which were heated by building fires in them and then raking out the ashes.

Benjamin Franklin transformed the art of heating and cooking by inventing the Franklin stove. This was a portable fireplace made of iron which could be set out into the room away from the chimney. It gave much more heat to the room than the fireplace. In the course of time Franklin's stove was changed in such a way as to make our modern cooking stove or range with its oven below and pot-holes in the top.

Our latest step in the control of fire is the use of gas and electricity in cooking instead of coal, wood, or kerosene.

COOKING

In the far-off days before written history we know that meat was first roasted by holding it over the fire on long sticks. It was also cut into pieces with flint knives and boiled in water in hollowed-out stones or stumps, into which hot stones were dropped as pot-boilers.

Grain was first eaten raw and whole. Then it was ground between two stones and the meal was eaten raw. Sometimes it was mixed with water and dried in the sun. It was first cooked by parching it in front of an open fire. Later grain was roasted or baked in fire pits with heated stones.

BREAD

And then while people were still in the Stone Age, the oldest period which we know anything at all about, people learned to bake little cakes of meal or parched grain. The making of grain cakes, or *bread*, by means of heat is one of the oldest of the arts. The cakes were made of various kinds of grain which had been crushed into a rude meal between stones. So we say that milling and baking are twin arts. We know that

people in the Stone Age made bread because hard little burned cakes made of coarsely ground grain have been found in the Swiss Lake Dwellings.

How did the Swiss Lake Dwellers bake their cakes? Probably the dough made by mixing meal and water together was laid on a flat or hollowed stone which had been heated, and the cake was covered with hot ashes. The baked cake must have been gritty with ashes but that mattered little to the hungry folk of the Stone Age.

The ancient Egyptians made excellent bread. Herodotus, the ancient Greek historian says of them "dough they knead with their feet, but clay with their hands." They baked small round loaves very much like the muffins which we have today. Other loaves were made long and thin and sprinkled on the top with seeds. The Egyptians had public bakeries in which the housewife could buy bread if she didn't wish to make it herself.

In Greece and Rome also there were public bakeries at an early period. The art of bread-making became an important industry in ancient Greece and Rome. Bread was made

under strict supervision of the law in Rome. The work of a Roman bakery at about the time Christ was born is pictured on the tomb of a master baker. We see the grain being brought to the bakery and paid for. We see it being ground in mills turned by a horse and a mule. We see men sifting out the bran from the ground meal by hand. Next come the bakers who mould the loaves on a board. Other men take the loaves and put them into the oven on a long-handled shovel. At last we see the basket of baked bread being weighed, and carried off on men's backs.

BAKING IN THE MIDDLE AGES

In the Middle Ages, a brick oven was built in every manor and the peasants were supposed to take their dough to this oven to be baked. The fee charged was usually about one loaf in every ten. This custom of baking bread in a common oven has led to the almost universal use of the public bakery in Europe.

In the Middle Ages the peasants used very coarse flour made of barley, rye or oats. This produced a *black bread* at which the nobles

shuddered. The nobles' bread was made of wheat flour which had been carefully sifted through cloth to make it fine and white. It was a sign of the baron's wealth when all the household was fed on white bread. In the castle ovens many different kinds of loaves were baked. There were great "pope's" or "knight's" loaves, smaller "squire's" loaves and little "varlet's" loaves or rolls. A soft bread was made by using milk and butter; and a two-color bread by using alternate layers of rye and wheat dough.

There were no plates in those days, and so large slices of bread were used instead. The meat to be eaten was placed on the bread trenchers and afterward the diners ate their plates. In order to be polite the knights used to cut off the crusts of their bread and give the soft inside to the ladies to soak up in their soup. Thin slabs of twice-baked bread, which we would call crackers, were often used in monasteries and for provisioning the castles in case of a long siege.

BAKING IN COLONIAL DAYS

When the Colonists came over to America from Europe they had to bake their own bread.

The oven was an indispensable part of every household. The oven was built of brick. A fire was built inside the oven and then raked out and the bread was put inside and baked by the heat of the hot bricks. The Colonists also used "Dutch ovens." A Dutch oven was an iron skillet set on legs and set in the coals. Live coals were also heaped on the lid covering the skillet.

BAKING TODAY

Many people who live in the country and in small towns today still bake their own bread, but in the larger towns most of the bread is bought from public bakeries where thousands of loaves are baked every day. The modern bakery is an organized industry with machinery for handling and weighing flour and other materials, high-speed mixers for mixing the doughs, fermentation rooms where the bread is set to rise, automatic dividing, rounding and moulding machinery, and controlled ovens that make possible the large-scale production of bread. The sanitary requirements are very strict so that the bread which comes to our homes is in accordance with high standards of public and industrial hygiene.

The best bread is that made of whole wheat flour. In graham and whole wheat bread almost the entire wheat grain is ground in making the flour. This means that we get all the nourishment which the grain plant stored away for the new plant which was to spring from the grain.

OAT CAKES

Oatmeal can be baked into cakes or biscuits. The Roman historian Pliny tells us that oat cakes were eaten by the ancient Germans, and the early Scots made oat cakes by mixing the meal with water and baking the dough on hot stones.

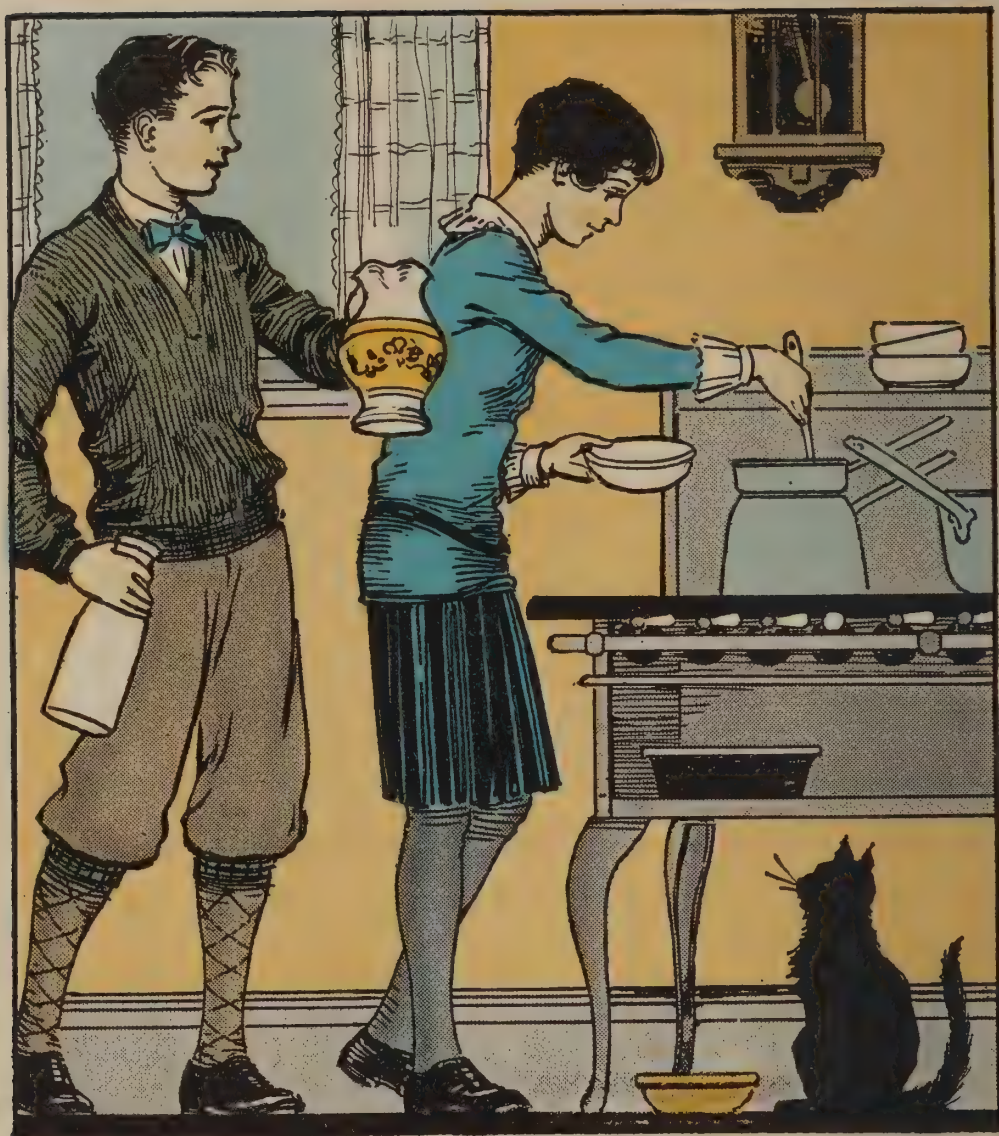
Oat cakes were so important a food to the Scots that they were used in many of the early religious festivals. One of these festivals was the lighting of the fire of Beltane on May Day Eve. The fire was usually kindled by rubbing sticks together. Over this fire a large porridge of eggs, butter, oatmeal and milk was cooked. Then everyone took a cake of oatmeal on which were nine square raised knobs. The knobs were dedicated to the supposed preservers of flocks and herds or to the real destroyers of them. Each person turned his face to the fire and breaking

off a knob flung it over his shoulder saying, "This I give to thee, preserve thou my horses; this to thee, preserve thou my sheep"; and so on. After that they used the same ceremony for the harmful animals: "This I give to thee, O fox! spare thou my lambs; this to thee, O hooded crow! This to thee, O eagle!" After the ceremony the people ate the porridge.

OATMEAL PORRIDGE

After the invention of pottery the grain was boiled in a pot placed directly over the fire. This was the first porridge. The story of *cooking* is bound up closely with the story of cooking utensils and the control of fire.

It is thought that the invention of pottery may have resulted from the fact that early peoples baked fish by coating it with clay and placing it in hot ashes. The heated clay made a hard shell about the fish and it is easy to see how the women who did the cooking came to daub baskets with clay to make them fireproof. Then they learned to make clay copies of hollowed stones and to bake them in the fire to make them hard. These were the first cooking pots and bowls.



OATMEAL
FOR BREAKFAST

Porridge has been a main dish all through the ages. Oatmeal porridge is particularly identified with Scotland where it has always been a staple food. Dr. Samuel Johnson who wrote a famous dictionary of the English language in the 18th century, defined oats as "a grain which in England is generally given to horses, but in Scotland supports the people." Whereupon a Scotchman retorted, "True enough, and where will you find such fine horses as in England or such fine men as in Scotland?"

Although Dr. Johnson thought of oats only as food for Scotchmen he must have seen a preparation of oats served in the coffee-houses which he loved to visit. Oats were cooked to make a thin gruel which was used as an ordinary drink.

We have seen that the oatmeal which we eat today is made from oats which have been carefully selected for their fine quality. Long cooking often makes oatmeal taste better. However, a quick-cooking oatmeal is now made by slicing the oat groats before they are rolled into thin flakes.

The proteins of any cereal do not furnish everything needed to make the body protein.

They furnish *almost* everything, however, and can be completed by the proteins which are contained in milk. We usually pour milk on our oatmeal and in this way our dish of oatmeal at breakfast is practically a perfect food.

THE END

Here we are back at our starting point, a bowl of oatmeal on the breakfast table. Our story began in those far-off days when there were no farmers, when the only mill was a set of teeth, when a circle of firelight on the ground was a charmed circle within which men, women and children were safe at night from wild beasts.

Our story ends with farming and milling as two of the greatest industries of the world. The farmer grows the oats, the miller grinds them, we cook and eat the oatmeal in our homes.

THE VERY END

In the *very* beginning there was that unknown someone who first ate grain and found that it tasted good. At the *very* end there are the boys and girls on the way to school who have had oatmeal and milk for breakfast.



HERE *you will find some questions to answer; some things to do; the names of some stories to read and a few left-over things you may wish to know about.*



CONCERNING THE GROWING OF THE OAT GRAIN

1. Why is it that when we grow plants in a window we have to keep turning them about to make them grow straight?

2. We know that it is absolutely impossible to grow plants without water. What percentage of a plant is made up of water? What percentage of the human body? Plants are continually losing water through their leaves. We may prove this by holding the under side of a geranium leaf against a cool window pane and noting the moisture which is condensed. Do you know the ways in which the human body loses water? How much water should we drink each day to be healthy?

3. Plants must have certain minerals in their diet if they are to grow and keep healthy. These minerals are taken up with the water which the roots draw from

the soil. If any one of the minerals necessary to the growth of the plant is lacking, the plant becomes puny and sick looking. A well-balanced diet is just as necessary for human beings as for plants. Try your hand at planning a well-balanced diet for a boy or girl for one day.

4. Leafy vegetables and fruits are called *protective* foods. This means that they contain substances which protect us against certain diseases. Another important protective food is milk. Name some plants whose leaves are good to eat; whose roots are good to eat; whose fruit is good to eat (by fruit we mean that part of the plant which contains the seeds).

5. You may read a short account of the first voyage of Captain James Cook in an article called *The Columbus of the Pacific* in the "National Geographic Magazine" for January, 1927. After reading the story tell why Captain Cook was able to keep his sailors healthy when, before his time, men who went on long voyages almost always had scurvy. Why did his sailors grumble at having to eat fresh foods? Why is it so important to train ourselves to like wholesome foods when we are young?

6. If you are interested in knowing more about plants there is a good short article about them in Compton's *Pictured Encyclopaedia*, pp. 2820-2831, Vol. 7, F. E. Compton & Company, Chicago, Ill.

7. If you would like to know more about protective foods a good book to read is McCollum-Simmonds, *Food, Nutrition and Health*, published by the authors, Baltimore, Md. On pages 43-44 and 114 protective foods are talked about.

CONCERNING THE FIRST FARMERS

1. If you would like to know more about life in the Stone Age read "The Knife and the Naked Chalk" in Kipling's *Rewards and Fairies*.

2. Primitive men, women and children had strong bodies. Can you give some reasons to explain why this was true?

3. See if you can describe one day in the life of a family of the Stone Age, giving also the bill of fare.

4. Do you know why it was fairly easy for the wandering tribes to conquer the people who had lived a long time in one place?

CONCERNING THE FARMERS OF MESOPOTAMIA, EGYPT, GREECE AND ROME

1. Why was farming easy in Mesopotamia and Egypt and difficult in Greece and Rome?

2. After reading the story of Joseph and his brethren in the Bible (Genesis) see if you can answer these questions: What caused the seven years of plenty in the

land of Egypt? What caused the seven years of famine? What does the sending by Jacob of his sons into Egypt to buy grain tell us about the economic position of ancient Egypt?

3. Read in the Bible the story contained in the first sixteen verses of the first chapter of Daniel. In the story the word *pulse* means seeds. Daniel wanted to eat simple vegetable foods like barley grain and peas and beans instead of the rich food of the king. What do we know about foods today which would explain why Daniel and his companions were "fairer and fatter" after eating pulse and water than the men who ate the king's meat and wine?

4. The story of Ceres and Proserpina, called "The Pomegranate Seeds," in Hawthorne's *Wonder Book and Tanglewood Tales*, is an allegory which the ancient Greeks told to explain the growth of grain from the seed dropped into the ground. After reading the story see if you can tell what Proserpina stands for in the allegory. What does the time which Proserpina must spend each year underground signify? What does her return to earth mean?

5. If you would like to know more about Jason and the Golden Fleece and about Cadmus and the Dragon's Teeth you can read the tales of their adventures in the *Wonder Book and Tanglewood Tales*. These stories are probably founded on the colonizing expeditions which the Greeks made at an early period of their his-

tory. They give good pictures of the agricultural life of the times.

6. It is said that "perhaps no other people ever had better bodies than the Greeks." See if you can give the reasons why this was true by describing one day in the life of an Athenian boy.

7. The life of the boys of Sparta is described in any good ancient history. What elements in their training made them grow into the strongest men of Greece?

8. The Romans as they grew to greatness were constantly at war. Can you tell why too much war and the luxury of a ruling people kept the Romans from making more progress in agriculture?

9. After Rome had become great the land in Italy was tilled by slaves. What are the great evils of slavery in an agricultural system?

CONCERNING THE FARMERS OF THE MIDDLE AGES

1. If you would like to know more about the life in Britain during the Roman occupation read the stories "A Centurion of the Thirtieth," "On the Great Wall," and "The Winged Hats," in Kipling's *Puck of Pook's Hill*.

2. Can you give some of the reasons why farming was so backward in the Middle Ages?

CONCERNING FARMING TODAY

1. This is a problem that you may like to work out if you are fond of mathematics and chemistry. Problem: What was a day of sunlight worth to the oat growers of the United States in the year 1922?

Directions: Secure a growing geranium plant. Cut a flat cork stopper in two and fasten the two halves upon a green growing leaf. Place the geranium in bright sunlight about 20 minutes. Then pick off the leaf and remove the cork. Boil the leaf in water one minute, then plunge it into alcohol and shake. What happens to the alcohol? To the leaf? Bleach the leaf as much as possible, rinse with clear water and dip in iodine. Iodine turns starch blue. Is starch present? If so, where? Is sunlight necessary for the manufacture of starch?

Oats contain a large amount of carbohydrates and fats. They make up about 62.26 percent of the digestible food material in the grain. The average number of days required for oats to grow to maturity is about 90 days. Find out from the Yearbook of the Department of Agriculture, 1922, the farm value of the oat crop of the United States for the year 1922.* If we assume that this value was produced in 90 days of

*Yearbook, Department of Agriculture. Separate 881 Statistics of Grain Crops, 1922. Price 10¢. This may be ordered from the Superintendent of Documents, Government Printing Office, Washington, D. C.

growing season, what was the value in dollars of a day of sunlight to the oat growers of the United States in the year 1922?

2. Here are the figures showing the percents of foods stored up in the whole oat kernel, in dry oatmeal, and in boiled oatmeal:

OAT KERNEL

Ash	3.46%
Fiber	12.07%
Water	10.06%
Fat	4.33%
Protein	12.15%
Carbohydrates (Sugar and Starch)	57.93%

DRY OATMEAL

Ash	1.9%
Fiber	0.9%
Water	7.3%
Fat	7.2%
Protein	16.1%
Carbohydrates	67.5%

BOILED OATMEAL

Ash	.5%
Water	84.5%
Fat	.5%
Protein	2.8%
Carbohydrates	11.5%

Draw a picture of an oat kernel, of a package of oatmeal, and of a dish of oatmeal, and divide them into sections to show the relative content of each food stuff.

3. If you live in a large town or city you may like to go to an implement dealer's storeroom and see how

many kinds of farm machinery which are used in grain production you can count.

CONCERNING THE MILLERS

1. The teeth of primitive and ancient peoples were in general very sound. Do you think that this had anything to do with the hard rough foods which they ate? Chew a handful of raw grain and see how long it takes. The peasants of Europe eat hard crusty bread and they are noted for their strong white teeth. Does this fact suggest that we should include in our everyday diet some foods which need long chewing?

2. Our bodies need lime with which to build strong bones and teeth. Do you know of any foods which are known to contain a high percentage of lime?

3. In this country about 3% of the total oat crop is made into oatmeal. You can find out the number of bushels of oats grown in the United States in 1922 from the 1922 Yearbook of the Department of Agriculture, (Separate 881, Statistics of Grain Crops, 1922) * and so compute the number of bushels made into oatmeal.

CONCERNING THE COOKS

1. Charles Lamb's "A Dissertation upon Roast Pig" is an imaginary story of how Chinamen first came to

*Order from the Superintendent of Documents, Government Printing Office, Washington, D. C. Price 10¢.

use fire in cooking meat. You may find this story in the collection of Lamb's essays called *Essays of Elia*.

2. In the Middle Ages we have seen that the nobles used to scoff at the coarse black bread of the peasants. In what way was this coarse bread better than the fine white bread of the nobles? Why do we say that a certain amount of roughage in our food is necessary for health? See if you can name some foods which supply roughage to the body.

3. If you would like to know the fascinating story of milk and why it is called "the perfect food," read *The Path of the Gopatis*, (published by the National Dairy Council). The name Gopatis, means "Lord of the Cows."

5. The average composition of milk is as follows:

Water	87.4%
Fat	3.7%
Protein	3.2%
Carbohydrates	5.0%
Ash	0.7%

Other bulletins on oats which you may like to order from the Superintendent of Documents, Government Printing Office, Washington, D. C. are as follows:

1. *Spring Oats Production*. Farmers' Bulletin, No. 892. Price 5¢. This contains a map showing the principal localities where oats are grown in the United States.
2. *Oats: Distribution and Uses*. Farmers' Bulletin, No. 420. Price 5¢.
3. *Fall Sown Oats*. Farmers' Bulletin, No. 1119. Price 5¢.
4. *Geographical Phases of Farm Prices; Oats*. Farmers' Bulletin, No. 755. Price 5¢.

OTHER PUBLICATIONS OF THE SCHOOL HEALTH SERVICE

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